

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-17 are currently pending. Claims 1 and 13 have been amended; and Claims 16 and 17 have been added by the present amendment. The changes and additions to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claims 1-3, 5, 7, 8, 10, and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent Application No. 11-172796 to Honma (hereinafter “the ‘796 patent”) in view of U.S. Patent No. 6,044,667 to Chenoweth (hereinafter “the ‘667 patent”); Claims 13 and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent Application No. 01/006238 to Watanabe et al. (hereinafter “the ‘238 patent”) or the ‘796 patent, in view of the ‘667 patent; Claims 4, 6, 9, and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘796 patent in view of the ‘667 patent, further in view of U.S. Patent No. 6,886,364 to Ohama et al. (hereinafter “the ‘364 patent”); and Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘238 patent or the ‘769 patent, further in view of the ‘667 patent and the ‘364 patent.

Amended Claim 1 is directed to a process of reforming a quartz glass crucible, wherein the quartz glass crucible is reformed by an arc discharge generated by a electrode positioned around a rotational axis and configured to heat an inside surface of the crucible while the crucible is rotated, the process comprising: (1) arranging the electrodes in an electrode structure in which neighboring electrodes are positioned at regular intervals from each other in a ring-like configuration; (2) forming a stable ring-like arc between the neighboring electrodes, without generating a continuous arc between electrodes facing each other across a central portion of the ring-like configuration, by controlling electric current to

the electrodes; (3) heating the inside surface of the crucible; and (4) removing one of a foreign substance located on the inside surface and a bubble located under the inside surface. Claim 1 has been amended to clarify the step of forming a stable ring-like arc between the neighboring electrodes. No new matter has been added.

Regarding the rejection of Claim 1 under 35 U.S.C. § 103, the Office Action asserts that the '796 patent discloses everything in Claim 1 with the exception of the "specifics of the arc discharging electrodes used," and relies on the '667 patent to remedy those deficiencies.

The '796 patent is directed to a quartz glass crucible for pulling up a silicon single crystal by feeding a powdery quartz raw material into a rotating mold, forming a formed body having a crucible shape, arc melting the formed body to obtain a quartz glass crucible, further mechanically grinding the whole inner surface of the quartz glass crucible, and remelting the inner surface by arc melting or high frequency plasma flame melting.¹ However, as admitted in the Office Action, the '796 patent fails to disclose arranging electrodes and electrode structures in which neighboring electrodes are positioned are positioned at regular intervals from each other in a ring-like configuration, and forming a stable ring-like arc between the neighboring electrodes, without generating a continuous arc between electrodes facing each other across the central portion of the ring-like configuration, as recited in Claim 1.

The '667 patent is directed to a system for melting and delivering glass to a work area such as spinners for making fiberglass including a melter, and a melter for melting glass from batch material to form a pool of molten glass including a bottom wall, inside wall, and at least one discharge port. As shown in Figure 1A, the '667-patent discloses six electrodes equally spaced in a circular pattern about the center of a cylindrical tank. Further, the '667 patent discloses that the plurality of electrodes are arranged within the molten pool so as to generate a "hot spot" of molten glass. However, Applicants respectfully submit that the '667

¹ '796 patent, Abstract.

patent fails to disclose forming a stable ring-like arc between the neighboring electrodes, without generating a continuous arc between electrodes facing each other across a central portion of the ring-like configuration, by controlling electric current to the electrodes, as recited in amended Claim 1. The '667 patent does not teach or suggest that by controlling electric current to the electrodes, a stable ring-like arc between neighboring electrodes can be formed without generating a continuous arc between electrodes facing each other across a central portion of the ring-like configuration, as recited in Claim 1. Rather, as shown in Figure 3 of the '667 patent, the '667 patent merely discloses theoretical paths of heating current extending among the electrodes.

Thus, no matter how the teachings of the '796 and '667 patents are combined, the combination does not teach or suggest forming a stable ring-like arc between neighboring electrodes, without generating a continuous arc between electrodes facing each other across a central portion of the ring-like configuration, by controlling electric current to the electrodes, as recited in Claim 1. Accordingly, Applicants respectfully submit that the rejection of Claim 1 (and all similarly rejected dependent claims) is rendered moot by the present amendment to Claim 1.

Claim 13 recites limitations analogous to the limitations recited in Claim 1. Moreover, Claim 1 has been amended in a manner analogous to the amendment to Claim 1. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that the rejection of Claim 13 (and dependent Claim 15) is rendered moot by the present amendment to Claim 13.

Regarding the rejections of dependent Claims 4, 6, 9, 11, and 14 under 35 U.S.C. § 103, Applicants respectfully submit that the '238 and '364 patents fail to remedy the deficiencies of the '796 and '667 patents, as discussed above. Accordingly, Applicants

respectfully submit that the rejections of dependent Claims 4, 6, 9, 11, and 14 are rendered moot by the present amendment to independent Claims 1 and 13.

The present amendment also sets forth new Claims 16 and 17 for examination on the merits. New Claim 16, which depends from Claim 1, clarifies that the arranging step comprises arranging nine electrodes at regular intervals in the ring-like configuration, and the forming step comprises applying three-phase alternating current to the electrodes. Similarly, new Claim 17, which depends from Claim 1, clarifies that the arranging step comprises arranging eight electrodes at regular intervals in the ring-like configuration, and the forming step comprises applying four-phase alternating current to the electrodes. New Claims 16 and 17 are supported by the originally filed specification and do not add new matter.² Moreover, based on the asserted allowability of Claim 1, Applicants respectfully submit that new Claims 16 and 17 patentably define over the cited references.

Thus, it is respectfully submitted that independent Claims 1 and 13 (and all associated dependent claims) patentably define over any proper combination of the '796, '667, '238, and '364 patents.

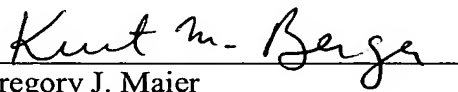
² See, e.g., Figs. 2 and 4, and the discussion related thereto in the specification.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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